TokenInsight
Global Token Data & Rating Agency

ADA Rating Report

Project	Cardano
Rating	BBB
Watch	Developing
Label	Platform, Smart Contract
Time	May 26th, 2018

PRICE（USD)	0.20
MKT. CAP (USD)	5.15 billion
MKT. CAP. RANK	8

Contents

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Latest Cardano (ADA) - USD Historical Price Chart

Overview

The rating of ADA is BBB. At present, ADA is still regarded as being in its early stages of development and so the project is considered to be quite susceptible to internal and external influences.

Aiming to develop an advanced platform dedicated to smart contracts, ADA team plans to provide a scalable, interoperable, and sustainable general platform with a combination of features and achievements. However, a multi-purpose project designed to be this ambitious does come with a higher degree of risk in its ability to become successful.

At the moment, ADA offers transaction fees as incentive for its nodes. Extra incentives for generated by blocks are excluded from the incentive, which may be detrimental to the participation of node building and its community. Regardless, its treasury system plays an innovative role as a means of governance and contributes to the entirety of the ADA ecosystem construction.

ADA is in the charge of IOHK, Emurgo, and the Cardano Foundation. It is well supported by top-notch blockchain technologists who hold high levels of academic achievements. It also has a competitive incubating ability that enables it to be considered one of the strongest in its class. In addition, it is designed with strong code, crowdfunding auditing, and other supervisory measures. However, when compared with its rivals ETH and EOS, ADA currently lags behind in its community user base and code activity.

Watch

Since there is no definite schedule in its multi-thread process, its rating can be raised, lowered or unchanged in the short term.

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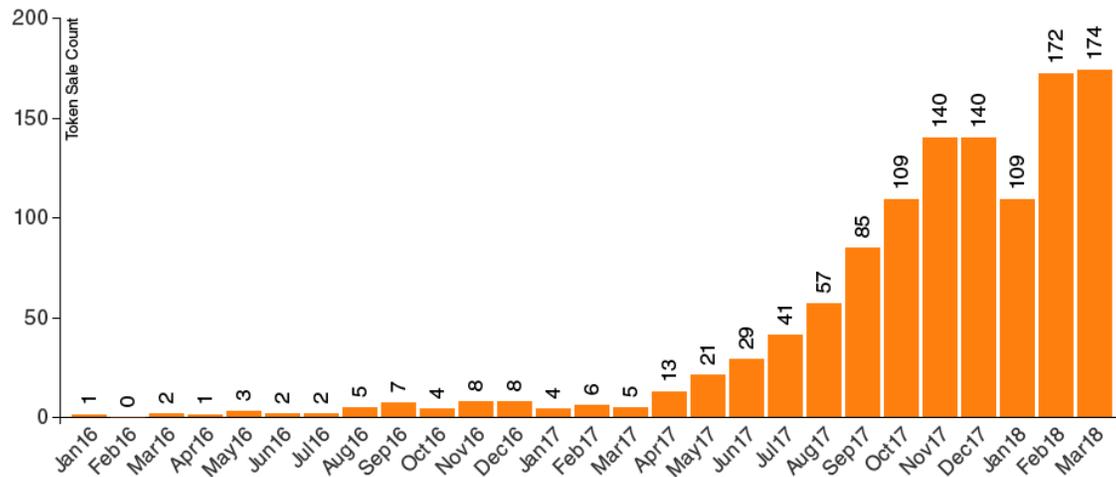
Industry Analysis

Decelerating growth of token projects reveal that the industry is undergoing a short-term adjustment

Exhibit 1 Number of Global Issued Tokens in the Past Two Years

Number of Token Sales by Month
Count of token sales, Jan16-Mar18 (min raise $100k)

Source: Elementus

According to statistics from Elementus, from April 2017 to March 2018, the number of crowdfunding tokens (min raise $100 thousand) has soared to 174 from 13, accompanied by an upsurge total amounting $6.8 billion to $80 million. However, we can see that there was a significant slowdown in the growth trends during that period of time. This could have resulted from many factors: Those being adjustments of the token market, bottlenecks caused by the progress of blockchain technology, the increasing uncertainty of the regulatory environment, and so on.

The substantial increase of token projects in such a short period of time has created a bubble in the industry, together with such negative impacts brought about by some fraudulent or runaway projects, some investors thus have already adopted a wait-and-see approach. We are seeing now that market participants are becoming more and more rational, and as a result, the whole industry is undergoing a formidable adjustment. With increasing numbers of token projects coming into the developmental stage from their beta, a huge gap has been revealed between vision ideology and applications of what is actual reality and value of blockchain technology. Implementation difficulty and complexity of innovative technology rush to solve issues without realizing its true purpose. All these problems currently cloud the progress and development of blockchain technology. Although some countries have imposed regulatory policies on token market, mainstream countries still hold an ambiguous attitude towards its usefulness. Not only does it prevent some investors, project teams, and potential participants from getting the underlying benefits

of blockchain, but rather also adds more uncertainty to the already perplexing token market.

The number of tokens with a SEC (Securities and Exchange Commission) registration has risen to 36 (March, 2018) from 1 (April, 2017) within the past year. The sum in the first quarter of 2018 was 83, increasing by more than 46 in the fourth quarter of 2017. As for the proportion of all crowdfunding tokens, that number has climbed to 18.24% from 9.51% during Q4 of 2017. This is a clear indication that a growing number of token projects are seeking to meet regulatory requirements and comply with legal policies. Yet many token projects don't have much pressure or motivation to disclose important information or at least improve information through transparency, which may have something to do with the particular arrogance of certain token projects (cross–regional, etc.). The immaturity of the current industry and the absence of industry self-regulatory organizations, has been due to a lack of token-related policies (excessive consideration toward financial risk) and so on.

Exhibit 2 Number of Tokens with a SEC Registration in the Past Year
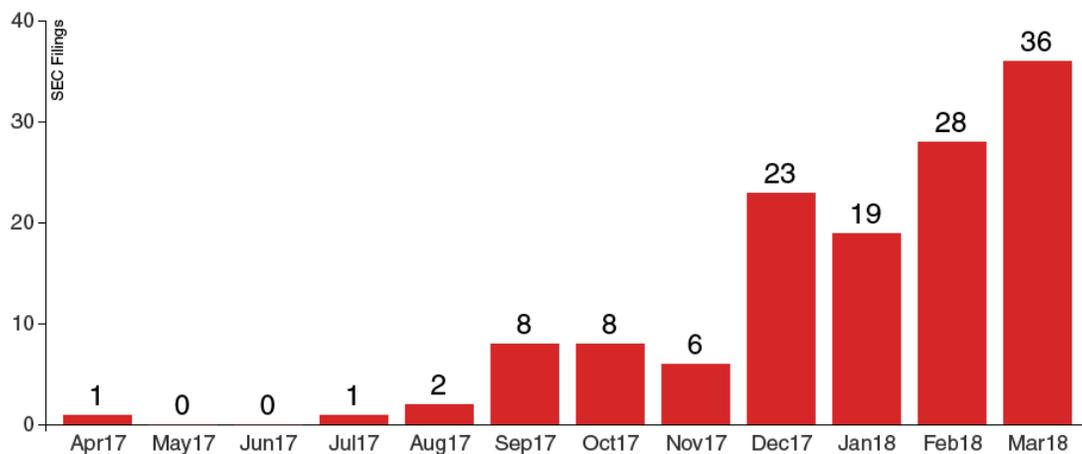
Source: Elementus

Market Analysis

Token market is undergoing a volatile adjustment and the secondary market of ADA fluctuates significantly

Exhibit 3 Market Value Change of ADA

Source: Coincheckup

By May 25th, 2018, the total market value of ADA was $5.46 billion (1.58% of the entire industry market value), ranking 8th among all tokens. At the moment, the market value of the general platform tokens accounts for approximately 30% of the whole industry, and ADA occupies 5.67% among those general platform tokens, ranking third and close to half of the market value of EOS, but less than 1/10 of that of ETH.

Coincheckup statistics shows that ADA's token was first traded publicly in the secondary market at a price of $0.02 in October, 2017. That price went up sharply and peaked in January, 2018 to ($0.75), and then fell back substantially to $0.20. The performance of global tokens on the market recorded a 14.61% fall in the past month (from April 26th to May 25th), while the price decline of ADA in the past 30 days reached 25.69% and held a monthly turnover ratio of close to 100%.

Exhibit 4 Trading Proportions of Different Exchanges (May 25th, 2018)
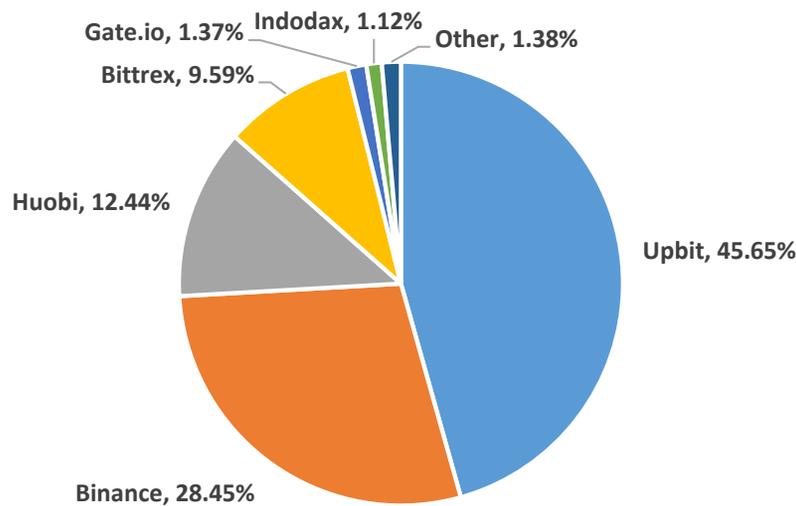
Source: Coinmarketcap

So far ADA has been listed on many exchanges and has a $0.126 billion average trade volume in 24 hours (May 25th, 2018). Most trade volume is based on KRW (41.87%), BTC (28.10%), USDT (23.47%) and ETH (1.95%), and centered on exchanges known as Upbit (45.65%), Binance (28.45%), Huobi (12.44%) and Bittrex (9.59%) and others.

Technical Analysis

Aiming to overcome the overall weakness of general platform projects, ADA plans to use a hierarchical structure to achieve multiple objectives

Rivaled to ETH, EOS and others, ADA works on building a low-level public chain as a general platform. As for design plan, the ambitious team plans to build a widely usable and widely sustainable system with updated hypothetical features and engineering capabilities. Compared to other established general platform projects, ADA is likely to gain an advantage by enhancing its scalability, interoperability, and sustainability.

With regards to scalability, ADA sets out to improve its consensus algorithm, communication between nodes, and data storage. ADA uses Ouroboros algorithm to reach a consensus. Ouroboros PoS algorithm originated from an academic paper which was issued around top conference (CRYPT02017) and published by several cryptography experts from IOHK. Ouroboros is a kind of PoS (Proof of Stake) consensus algorithm and has been proven by theoretical computation. With some engineering modifications, the applied Ouroboros algorithm not only costs much less, but provides more security and acceleration to processing speeds significantly (in terms of TPS, Transaction per Second). However, processing speed does not equal processing capacity. In order to

avert possible network congestion, ADA plans to use RINA (Recursive Internetwork Architecture) to process the communication between nodes. Moreover, it allows for nodes to not have the need to store its information onto the entire ledger. The amount of data to be stored in nodes can be reduced by means of pruning, subscription, and compression. The newly joined light nodes can implement network synchronization through snapshots, instead of downloading the whole ledger, to get a quick access to ADA network.

The improvement of interoperability centers around the interaction capabilities among other systems, as well as compliance. ADA will utilize sidechain technology to realize information and circulation among its systems. This means that different tokens can come out of their blockchain constraints. The systems here include all sorts of token projects, as well as traditional financial systems. In order to integrate with traditional financial systems, ADA will add Metadata to transaction records in order to provide its users with identification and regulatory options under the pre-condition that each users' anonymity is well protected. Thus, ADA will play more roles under more affluent circumstances and users can choose to disclose more information tailored to their own needs while limiting its utility time and application scope.

For the sake of continuous iteration and improvement, ADA designed a treasury system to support its ecological construction. ADA will implement a set of so-called CIP (Cardano Improvement Proposal) rules, which gives community members right to vote for iteration priorities. In this way, the forward-looking direction of ADA will be decided by all members' votes. CIP rules will be executed in the form of smart contracts.

Exhibit 5 Comparisons of Main Parameters of Some General Platform Projects

Abbreviation	Release Time of Mainnet (estimated)	Consensus	Block Time (s)	TPS	Technical Feature
ADA	Sept. 2017	Ouroboros	20	257 measured; no limit theoretically	layered architecture
ETH	Jul. 2015	PoW+PoS	20	20 at present; lightning network will be used in the future	virtual machine; smart contract; sharding
EOS	Jun. 2018	DPoS+BFT	1	3,000 for one test chain; expected 1,000,000	21 supernodes; cross chain interaction
NEO	Oct. 2016	DBFT	20	1,000 measured; 10,000 expected	digital certificate; smart contract; cross chain interaction
QTUM	Sept. 2017	PoS	120	70 measured; lightening network will be used in the future	UTXO model; virtual machine
LSK	Aug. 2016	DPoS	10	2.5 measured; 100,000 expected	101 main nodes; side-chain
ZIL	Q3, 2018	PoW, BFT	N/A	AWS 2,088 measured; VISA Class expected	smart contract; sharding

Source: Official Source

ADA divides the system into a Cardano Settlement Layer and Cardano Computation Layer for implementation. Cardano Settlement Layer is a simple but safe network that provides basic services like token transfers and block building. The Cardano Computation Layer can be regarded as the sidechain of Cardano Settlement Layer. Users can operate smart contracts written in Plutus (the development language for smart contracts exploited by ADA team). Its token is designed to be freely circulated between the Cardano Settlement Layer and the Cardano Computation Layer, as well as all token systems and traditional financial systems in the end.

As a kind of PoS algorithm, the Ouroboros algorithm used in ADA is the first to be proven by rigorous mathematical reasoning and quantitative testing. To be specific, the Ouroboros algorithm divides time into different units, where bigger unit is named Epoch and a smaller unit is named a slot. Stakeholders will vote for leaders of all slots in each Epoch and every slot leader is entitled to produce a block within that position on the precondition that the vote rights are in accordance with stake portions. This ensures the randomness of the chosen slot leaders, as Ouroboros adopts MPC (Multi-party Computation) method. To protect block producers, all slot leaders (core nodes) can only communicate with other relay nodes and are not allowed to participant during trading. Since not all stakeholders are willing or able to build blocks and participate in governance, they can entrust their equities by signing a certificate. The entrustment certificate has a validity term and is revocable.

ADA employs a unique development approach and uses the Haskell language, a functional programming language which is popularly used and seen in academia. Besides, throughout the processes of the theory-to-code conversion and code test, developers use formal specification, validation, and verification to prove the correctness of code mathematically and logically. ADA gains an advantage on throughput over ETH. The further development of ETH will be severely restricted by the low processing speeds until it is able to replace its consensus algorithm with PoS or implements its new sharding featurization. There are many similarities between the DPoS mechanism adopted by EOS and the PoS of ADA. The difference lies in that ADA does not have a definite number or identities for block producers, guaranteeing its decentralization and security at a much more advanced state.

Economic Model

A well-designed incentive mechanism combined with an innovative governance mechanism

Exhibit 6 ADA Token Allocation
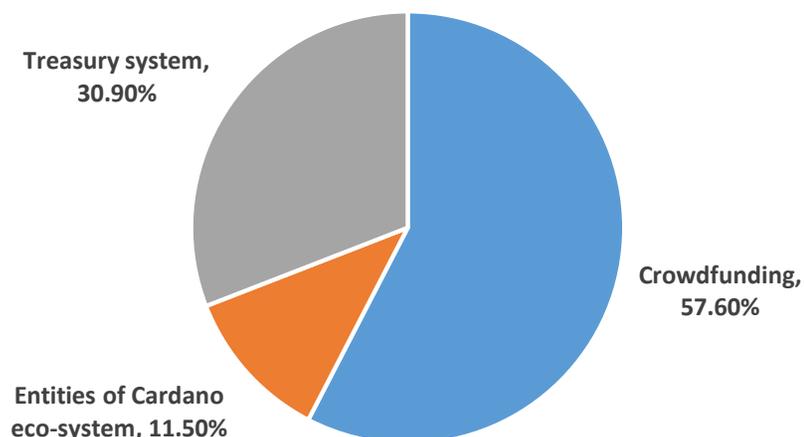
Source: Official Source

So far, the total liquidity of ADA token has reached 25.927 billion. The maximum supply of ADA tokens is 45 billion, of which 57.6% (25.927 billion) has been used for crowdfunding during the period from 2015 to 2017, 11.5% (5.185 billion) has been distributed to the three component entities of its Technical and Business Development Pool: IOHK, Emurgo, and the Cardano Foundation. The remaining 30.9% (13.887 billion, a small amount of transaction fee will be eliminated) is used for its treasury system. The crowdfunding audit report of the Cardano Foundation (Attain is responsible for the audit) reveals that the five-stage crowdfunding has raised 108,844.5 Bitcoins in sum, of which 94.45% have come from Japan, then South Korea at (2.56%), and finally China with (2.39%).

According to official information, the planned incentive mechanism of ADA has something in common with that of ETH. Both ADA and ETH have adopted the way of transaction fees as incentive, and the total amount of tokens are limited. The mining proceeds of ETH nodes come from block rewards and transaction fees, while proceeds gained by block production of ADA nodes has the only source, that is transaction fees (block reward given by treasury system is possible). In the aspect of user incentive, ADA has some lessons to draw from the superior user friendliness of EOS. For example, users of their DApps don't have to pay direct fees, which is a positive look for the overall mechanisms employed through their systems.

As for a governance mechanism, ADA has not adopted definite schemes like account suspending, code change and constitution revision and so on, but its treasury system can play a similar role. In the form of a certain percentage of newly produced tokens and transfer fees, its fund was raised for purposes such as governance affairs like voting decision and constitutional amendments needed as they arise.

Exhibit 7 Comparisons of Incentive Mechanism and Governance

	ADA	EOS	ETH
User Incentive	Users need ADA tokens for each transaction, which is influenced by ADA token's price fluctuations. Stakeholders can entrust their equities to other nodes.	Bandwidth resource is distributed to users in proportion to their token shares and is exempted from influence of price fluctuations. Users can lease or sublease spare bandwidth as a source. DApp users don't have to pay access fees directly.	Users need GAS tokens for each transaction and is influenced by GAS token's price fluctuations.
Block Producer Incentive	Transaction fees will be used for node incentive. The total amount is limited to 45 billion.	EOS will issue no more than 5% of tokens annually for its proposals and supernode rewards (EOS team revealed that the supernode reward occupies 1% for the moment).	Block producers will gain some profits after shifting to PoS. The cap of total amount is set at 100 million and the supply now is 98.8 million.
Community Governance	Designed a treasury system, which will be formed by newly generated ADA tokens (about 13.9 billion) and transfer fee donations. Stakeholders can determine the usage of treasury funds by voting.	As means of community governance, there are account suspensions, code changes, constitution revisions and so on. Block.one team is held responsible.	The Ethereum Foundation is responsible for community governance.

Source: Official Source

Team Strength

ADA has a team with excellent technical backgrounds and its ecosystem construction can benefit from cooperative entities

There are three entities in charge of ADA: IOHK, Emurgo, and the Cardano Foundation. Set up by co-founder Charles Hoskinson of the Ethereum network and former operation officer Jeremy Wood of the Ethereum network. IOHK is a research and development company of blockchain technology and responsible for the development of ADA from 2015 to 2020. Emurgo is a start-up incubator in Japan and is responsible for supporting and accelerating ADA-related commercial projects. So far, SIRIN LABS, CHINACCELERATOR, MOX, and other partners have been involved in the project's construction. The Cardano Foundation is an independent entity in Switzerland and is responsible for Cardano's community construction, commerce, and compliance work. This includes entrustments of code auditing and crowdfunding auditing to FP Complete and Attain respectively.

The development team of ADA consists of academic researchers and professional engineers from all over the world. The adopted

Ouroboros algorithm was designed by an academic team led by Professor Aggelos Kiayias from University of Edinburgh, whose members come from five academic institutions.

**Exhibit 8 Major Investors and Cooperative Partners of ONT**

Institution	Institution Introduction	Cooperative Partners
IOHK	IOHK is a top engineering company of blockchain technology and responsible for the establishment of Cardano blockchain.	
Emurgo	Emurgo works on development, support, and incubation for business investment companies, as well as integration into the decentralized blockchain system, which is the Cardano system.	SIRIN LABS; CHINACCELERATIOR; MOX; BLOCKCAMP; LiqEase; SPES
Cardano Foundation	Cardano Foundation provides standardization, protection, and promotional services to the Cardano protocol technology and its applications.	

Source: Official Source

Popularity Analysis

Community members participate actively, and open-source codes are updated frequently

**Exhibit 9 Google Trends of ADA token, EOS token and ETH token**
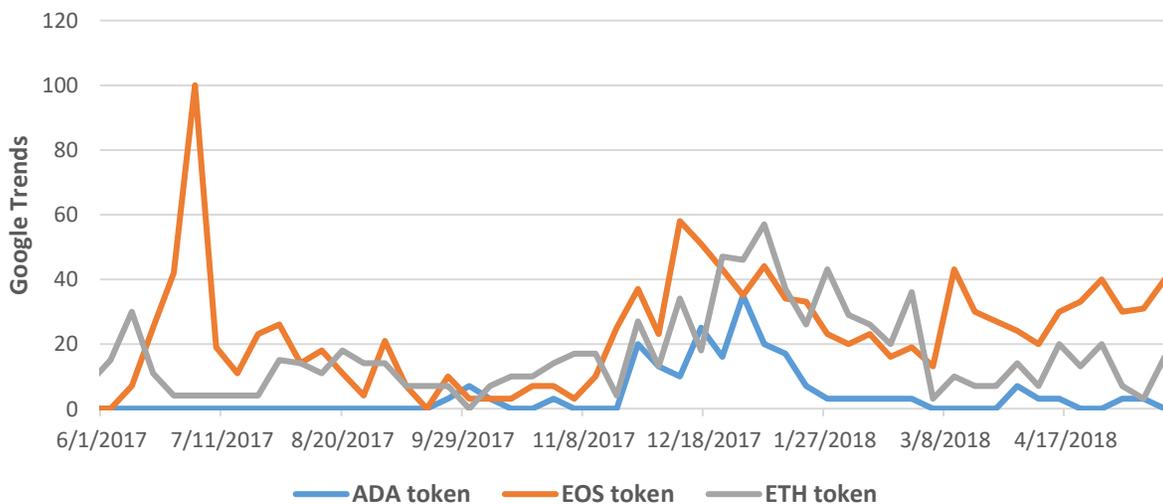
Source: Google Trends

As for Google trends of the ADA token, EOS token, and ETH token, ADA has seen a sharp rise since November 2017, and quickly

fell back after January, 2018. Its tendency is highly correlated and connected with that of ETH. Recent data of ADA and ETH show to be very similar in nature, but are undergoing opposite trends, while the former one is descending, the latter one is obviously ascending.

Exhibit 10 Community Popularity of ADA, EOS and ETH
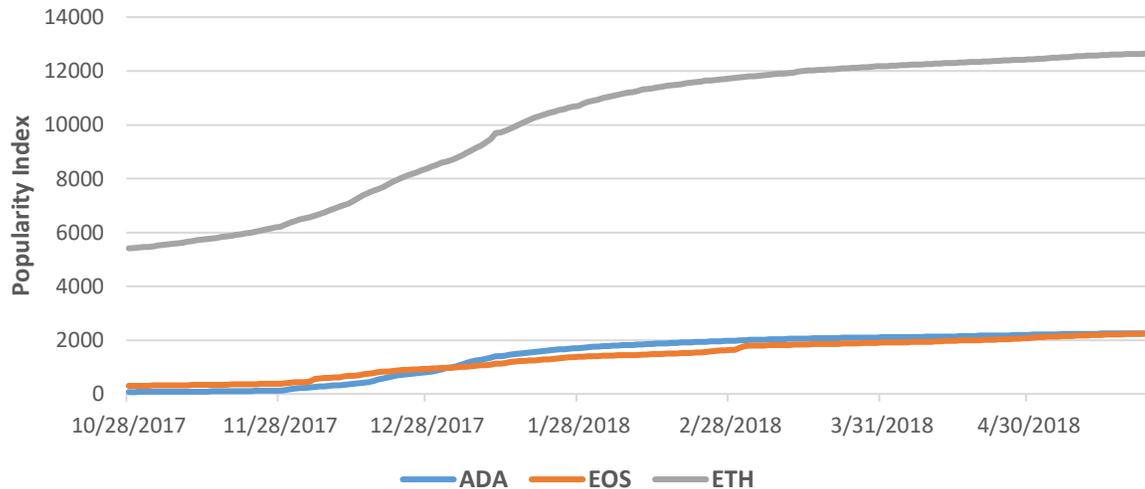
Source: Blockchaintrend, TokenInsight

According to statistics from BCtrend, in the past 6 months or so, popularity index symbolizing ADA community heat was in the range of 1000 to 2000 and took an ascend trend, which was very close to that of its major rival EOS. Though ADA now has a relatively high community heat, but still lags behind that of mature ETH.

Exhibit 11 Github Heat Indexes of Some Token Projects (by May 25th, 2018)

Token	Repository	Watch	Star	Fork	Github Heat Index	Commits for the Last 30 Days
ETH	go-ethereum	1826	17935	5759	1.00	71
EOS	eos	1158	7213	1772	0.43	368
NEO	neo	425	2408	751	0.16	17
ADA	**cardano-sl**	**396**	**2561**	**403**	**0.14**	**127**
QTUM	qtum	205	890	224	0.06	9
ZIL	Zilliqa	103	451	89	0.03	103
ONT	ontology	63	205	88	0.02	297

Source: Github, TokenInsight

*Github Heat Index is a comprehensive indicator of Github code heat, which is defined as:

Github Heat Index =30%*Watch /1826+30%*Star/17935+40%*Fork/5759

By May 25th, core code (cardano-sl) of ADA has 396 Watches, 2561 Stars and 403 Forks. Taking the parameters of core code (go-ethereum) of ETH as standards, the Github popularity of all other projects can be measured comparatively. Through the comparisons of popularity indexes on Github, it be found that the more mature a project is (that means a higher level of open source code submits), the higher its popularity index becomes. The popularity index of ADA on Github scores in at 0.14, which is closest to that of NEO's 0.16, but far below that of EOS's 0.43. The total amount of Commits for cardano-sl in the past 30 days is 127, which is significantly higher than that of go-ethereum (71) and is an indication that frequent code updates of cardano-sl have been submitted to Github recently.

Code Analysis

Lines of open-source code are relatively few, and some code has been audited by third parties

Graph 12 The Lines of Open-source Code and Contributors of ADA, EOS and ETH
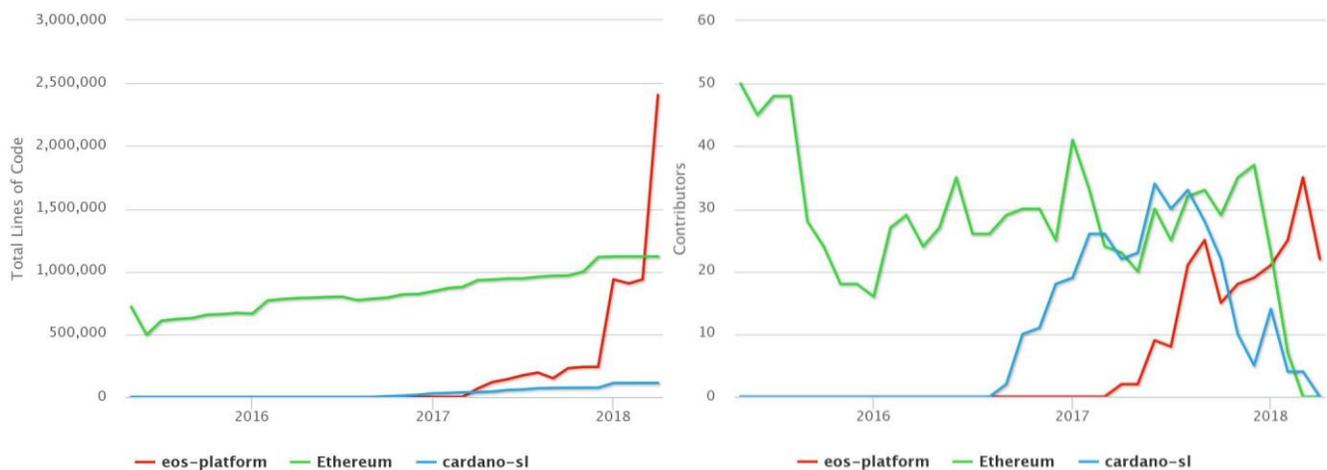
Source: Openhub

According to statistics from Openhub, the total amount of code lines in the code library of cardano-sl is about 0.11 million, equaling 1/10 of that of Ethereum. The statistical data reveals that the overall figure has increased rapidly in the year of 2017, but made no progress since the beginning of 2018. Besides, there have only been 5 contributors to the code library of cardano-sl in the past 30 days or so, which is far lower than that of Ethereum (41) and the eos-platform (46).

ADA involves several third parties into code auditing and cater to the suggestions that they provide. FT Complete is obligated to issue periodical auditing reports and provide its overall status. The audit report is divided into six parts: code, code management, continuous integration, dependencies, documentation, and quality. All aspects of the project code are audited thoroughly and

problems will be reported to ADA team on periodically. It is evident from the report that FT Complete pays constant attention to the development process of ADA and follows the reporting problems with prioritized concern. The development team of ADA will look into the reported problems and give explanations based on their understanding. The formal entrusted code auditing is rare among open-source projects and shows that the team of ADA has put a premium on the development quality of its project. However, on the other hand, it may also have something to do with the scarcity of Haskell developers and it cannot be monitored by community members.

Project Progress

ADA is in the multi-thread process and lacks a definite progress schedule

That release comes immediately after implementation is the principle ADA follows during development process. The development process includes five stages: Byron, Shelley, Goguen, Basho, and Voltaire. Actually, every stage ends up with a new release of a major version update. But after the stage of Byron, the development team would rather add a tested completed function to the existing system one by one than update the overall system in one go. All groups undertake development tasks at the same time, and the tasks may belong to different stages. Hence there can be unfinished work left in each stage. So far Byron version has been almost accomplished and the main net of Cardano Settlement Layer has been launched. The overall project has advanced into Shelley stage and Goguen stage.

ADA will achieve its decentralization goal in the stage of Shelley, including the implementation of entrustment processes and the establishment of its equity pool. Meanwhile, with newly added functions including multi-signature account, paper wallet, multi-account, third party wallet system, and so on. The performance of its wallet will get significantly enhanced. Focused mainly on the smart contract and sidechain, the Goguen stage is under development concurrently. The development team has already completed half of the Goguen testnet and will release important components in the second quarter. Basho and Voltaire will deal with performance improvements and establishments of its treasury and governance systems; stay tuned detailed plans that will be announced in the future.

Exhibit 13 Progress Roadmap of ADA

Byron: Release mainnet of Cardano Settlement Layer; implementation of the Ouroboros consensus protocol; implementation of Deadalus wallet, exchange API and log submit mechanism

Current progress：Mainnet of CSL has already been launched on September 29th, 2017; all tasks have been accomplished except for the exchange API which 90% has been finished.

Shelley: Released testnet with entrustment process and equity pool; implementation of multi-signature account, paper wallet, multi-account wallet,s and third-party wallet; security and performance improvements; implementation of anti-quantum signature; done through team and community building.

Current progress: 75% of entrustment (core nodes) and 80% of consensus rewards and costs have been completed; improvements of wallet and client functions have been halfway there; the overall progress is as expected (will be finished in Q2 and Q3 of 2018).

Goguen: Smart contract integration; implementation of sidechain (CCL), multiple bookkeeping models and multi-token ledger; implementation of components for smart contract such as Plutus, Plutus Core and IELE

Current progress: 75% of sidechain and 60% of bookkeeping model have been finished; KEVM will be released in May 28th; IELE VM will be released in this July; 50% of Goguen testnet has been completed

Basho: Performance improvement

Voltaire: Establishments of treasury and governance systems

Source: Official Source

Appendix 1: Symbols and Definition of Risk Ratings

Rating	Description
AAA	The project has extremely strong security and certain external factors of influence on project development is minimal.
AA	The project has strong security, project development timeline is on track, and certain external factors of influence on project development is minimal.
A	The project has strong security; future development is susceptible to internal and external uncertainty factors.
BBB	The project is, susceptible to external factors and prone to large fluctuations.
BB	The project is moderately qualified, with some risks, and there is great uncertainty about the future development.
B	The project is poorly qualified, holds high risk, and has trouble developing its own capabilities.
CCC	The project value is very low and the company/team has some bad track records.
CC	The project value is extremely low and the company/team has many bad track records.
C	The project is largely worthless and the company/team has a large number of bad records.
D	The project is worthless.

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Global Token Data & Rating Agency

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